Learning to Train Neural Networks for Real-World Control Problems

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ABSTRACT

Over the past three years, our group has concentrated on the application of neural network methods to the training of controllers for real-world systems. This presentation will describe our approach, survey what we have found to be important, mention some contributions to the field, and show some representative results. Topics to be discussed include:

1) executing model studies as rehearsal for experimental studies
2) the importance of correct derivatives
3) effective training with second-order (DEKF) methods
4) the efficacy of time-lagged recurrent networks
5) liberation from the tyranny of the control cycle using asynchronous truncated backpropagation through time
6) multi-stream training for robustness

Results from model studies of automotive idle speed control will serve as examples for several of these topics. Experimental results may also be shown.